

IN THE CLAIMS:

1. (Original) A charge-coupled device of XY addressing type, comprising:

a light-receiving unit that includes an XY matrix of pixel units in each of which photoelectric transfer and charge accumulation are performed;

5 a pulse generating circuit operable to generate two or more types of voltage pulses; and

a shift register operable to

(a) start scanning from a first pixel unit that is included in the light-receiving unit, when the two or more types of voltage pulses applied thereto in parallel from the pulse generating circuit are in a first combination, and

10 (b) start scanning from a second pixel unit that is different from the first pixel unit and is included in the light-receiving unit, when the two or more types of the applied voltage pulses are in a second combination that is different from the first combination.

2. (Original) The charge-coupled device of Claim 1, wherein

the pulse generating circuit generates a first voltage pulse, a second voltage pulse, and a third voltage pulse, each having a voltage level set at HIGH level or LOW level, and applies the first voltage pulse, the second voltage pulse, and the third voltage pulse to the shift

5 register, and

the first combination is a combination of the first voltage pulse and the second voltage pulse both being set at HIGH level and the third voltage pulse being set at LOW level at a first time point that is before scanning is started, and the second combination is a combination

of the second voltage pulse and the third voltage pulse both being set at HIGH level and the first
10 voltage pulse being set at LOW level at the first time point.

3. (Original) The charge-coupled device of Claim 2, wherein
the shift register includes:

a first pulse output unit operable to output a first selective pulse indicating to
select the first pixel unit from the light-receiving unit;

5 a second pulse output unit operable to output a second selective pulse indicating
to select the second pixel unit from the light-receiving unit;

a first scanning start unit operable to output, to the first pulse output unit, a first
scanning start pulse indicating to start scanning from the first pixel unit, when the first voltage
pulse and the second voltage pulse both being set at HIGH level are applied at the first time
10 point; and

a second scanning start unit operable to output, to the second pulse output unit, a
second scanning start pulse indicating to start scanning from the second pixel unit, when the
second voltage pulse and the third voltage pulse both being set at HIGH level are applied at the
first time point,

15 the first pulse output unit outputs the first selective pulse, when the first scanning
start pulse is applied at the first time point and the third voltage pulse being set at HIGH level is
applied at a second time point that follows the first time point, and

the second pulse output unit outputs the second selective pulse, when the second
scanning start pulse is applied at the first time point and the first voltage pulse being set at HIGH
20 level is applied at the second time point.

4. (Original) The charge-coupled device of Claim 3, wherein
the pulse generating circuit generates a fourth voltage pulse having a voltage level
set at HIGH level or LOW level, and applies the fourth voltage pulse to the shift register,
the first scanning start unit includes:

5 a first MOSFET, to a drain of which the fourth voltage pulse is applied and to a
gate of which the second voltage pulse is applied, where MOSFET stands for Metal Oxide
Semiconductor Field Effect Transistor; and
a second MOSFET, a drain of which is connected to a source of the first
MOSFET and to a gate of which the first voltage pulse is applied, and
10 the first scanning start unit outputs, as the first scanning start pulse, a voltage
pulse being set at HIGH level appearing at a source of the second MOSFET, when the fourth
voltage pulse being set at HIGH level is applied at the first time point.

5. (Original) The charge-coupled device of Claim 4, wherein
the shift register includes MOSFETs with a single channel.

6. (Original) The charge-coupled device of Claim 1, wherein
in the light-receiving unit, a pixel unit belonging to a first column is the first pixel
unit, and a pixel unit belonging to a second column that is different from the first column is the
second pixel unit, and

5 the shift register is a horizontal scanning shift register that is placed to extend in
an X-axis direction of the light-receiving unit and that scans the light-receiving unit in the X-axis
direction.

7. (Original) The charge-coupled device of Claim 1, wherein

the pulse generating circuit generates a first voltage pulse and a second voltage pulse, each having a voltage level set at HIGH level or LOW level, and applies the first voltage pulse and the second voltage pulse to the shift register, and

5 the shift register starts scanning from the first pixel unit when the first voltage pulse being set at HIGH level and the second voltage pulse being set at LOW level are applied at a first time point that is before scanning is started, and starts scanning from the second pixel unit when the first voltage being set at LOW level and the second voltage pulse being set at HIGH level are applied at the first time point.

8. (Original) The charge-coupled device of Claim 7, wherein

in the light-receiving unit, a pixel unit belonging to a first row is the first pixel unit, and a pixel unit belonging to a second row that is different from the first row is the second pixel unit, and

5 the shift register is a vertical scanning shift register that is placed to extend in a Y-axis direction of the light-receiving unit and that scans the light-receiving unit in the Y-axis direction.

9. (Original) The charge-coupled device of Claim 3, wherein

the pulse generating circuit generates a fourth voltage pulse having a voltage level set at HIGH level or LOW level, and applies the fourth voltage pulse to the shift register, and

5 the shift register ends scanning at a last pixel unit that is positioned last in a scanning direction in the light-receiving unit, unless the first voltage pulse and the fourth voltage pulse both being set at HIGH level and the second voltage pulse being set at LOW level are

applied at a third time point that is before scanning is ended, and ends scanning at a third pixel unit that is different from the last pixel unit, when the first voltage pulse and the fourth voltage pulse both being set at HIGH level and the second voltage pulse being set at LOW level are applied at the third time point.

10. (Original) The charge-coupled device of Claim 9, wherein
the shift register includes:

a third pulse output unit operable to output a third selective pulse indicating to select the third pixel unit from the light-receiving unit;

5 a fourth pulse output unit operable to output a fourth selective pulse indicating to select a fourth pixel unit that is positioned next to the third pixel unit from the light-receiving unit; and

a first scanning end unit operable to output, to the fourth pulse output unit, a first scanning end pulse indicating to end scanning at the third pixel unit, when the first voltage pulse and the fourth voltage pulse both being set at HIGH level are applied at the third time point,

the third pulse output unit outputs the third selective pulse, when the first voltage pulse being set at HIGH level is applied at the third time point, and

the fourth pulse output unit outputs the fourth selective pulse when the first scanning end pulse is not applied at the third time point, and the second voltage pulse being set at HIGH level is applied at a fourth time point that follows the third time point, and does not output the fourth selective pulse when the first scanning end pulse is applied at the third time point even if the second voltage pulse being set at HIGH level is applied at the fourth time point.

11. (Original) The charge-coupled device of Claim 10, wherein

the pulse generating circuit generates a fifth voltage pulse having a voltage level set at HIGH level or LOW level, and applies the fifth voltage pulse to the shift register,

the second scanning start unit includes:

5 a first MOSFET, to a drain of which the fifth voltage pulse is applied and to a gate of which the third voltage pulse is applied, where MOSFET stands for Metal Oxide Semiconductor Field Effect Transistor; and

a second MOSFET, a drain of which is connected to a source of the first MOSFET and to a gate of which the second voltage pulse is applied,

10 the second scanning start unit outputs, as the second scanning start pulse, a voltage pulse being set at HIGH level appearing at a source of the second MOSFET, when the fifth voltage pulse being set at HIGH level is applied at the first time point,

the first scanning end unit includes:

15 a third MOSFET, to a drain of which the fifth voltage pulse is applied and to a gate of which the fourth voltage pulse is applied; and

a fourth MOSFET, a drain of which is connected to a source of the third MOSFET and to a gate of which the first voltage pulse is applied, and

20 the first scanning end unit outputs, as the first scanning end pulse, a voltage pulse being set at LOW level appearing at a source of the fourth MOSFET, when the fifth voltage pulse being set at LOW level is applied at the third time point.

12. (Original) A charge-coupled device of XY addressing type, comprising:

a light-receiving unit that includes an XY matrix of pixel units in each of which photoelectric transfer and charge accumulation are performed;

a pulse generating circuit operable to generate two or more types of voltage

5 pulses; and

a shift register operable to

(a) end scanning at a last pixel unit that is positioned last in a scanning direction in the light-receiving unit, when the two or more types of voltage pulses applied thereto in parallel from the pulse generating circuit are in a combination other than a first combination,

10 and

(b) end scanning at a first pixel unit that is different from the last pixel unit and is included in the light-receiving unit, when the two or more types of the applied voltage pulses are in the first combination.

13. (Original) The charge-coupled device of Claim 12, wherein

the pulse generating circuit generates a first voltage pulse, a second voltage pulse, and a third voltage pulse, each having a voltage level set at HIGH level or LOW level, and applies the first voltage pulse, the second voltage pulse, and the third voltage pulse to the shift

5 register, and

the first combination is a combination of the first voltage pulse and the third voltage pulse both being set at HIGH level and the second voltage pulse being set at LOW level at a first time point that is before scanning is ended.

14. (Original) The charge-coupled device of Claim 13, wherein

the shift register includes:

a first pulse output unit operable to output a first selective pulse indicating to select the first pixel unit from the light-receiving unit;

5 a second pulse output unit operable to output a second selective pulse indicating to select a second pixel unit that is positioned next to the first pixel unit from the light-receiving unit; and

a first scanning end unit operable to output, to the second pulse output unit, a first scanning end pulse indicating to end scanning at the first pixel unit, when the first voltage pulse
10 and the third voltage pulse both being set at HIGH level are applied at the first time point,

the first pulse output unit outputs the first selective pulse when the first voltage pulse being set at HIGH level is applied at the first time point, and

the second pulse output unit outputs the second selective pulse when the first scanning end pulse is not applied at the first time point, and the second voltage pulse being set at
15 HIGH level is applied at a second time point that follows the first time point, and does not output the second selective pulse when the first scanning end pulse is applied at the first time point even if the second voltage pulse being set at HIGH level is applied at the second time point.

15. (Original) The charge-coupled device of Claim 14, wherein

the pulse generating circuit generates a fourth voltage pulse having a voltage level set at HIGH level or LOW level, and applies the fourth voltage pulse to the shift register,

the first scanning end unit includes:

5 a first MOSFET, to a drain of which the fourth voltage pulse is applied and to a gate of which the third voltage pulse is applied, where MOSFET stands for Metal Oxide Semiconductor Field Effect Transistor; and

 a second MOSFET, a drain of which is connected to a source of the first MOSFET and to a gate of which the first voltage pulse is applied, and

10 the first scanning end unit outputs, as the first scanning end pulse, a voltage pulse being set at LOW level appearing at the source of the second MOSFET, when the fourth voltage pulse being set at LOW level is applied at the first time point.